A. S. MOFFAT.

FILAMENT FOR INCANDESCENT BULBS.

APPLICATION FILED DEC. 23, 1915.

1,222,119. Patented Apr. 10, 1917.

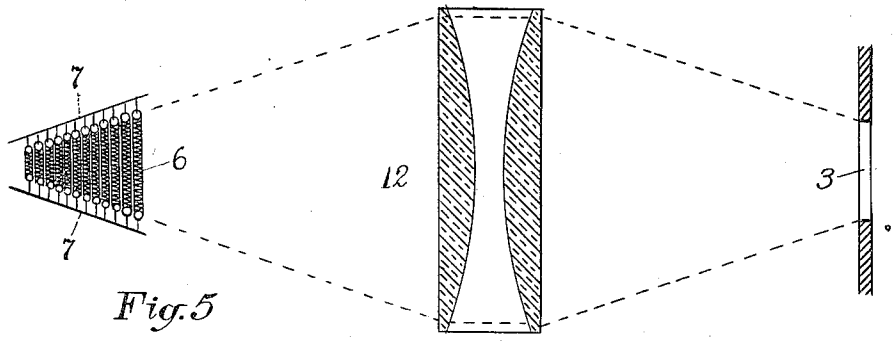


Fig. 5

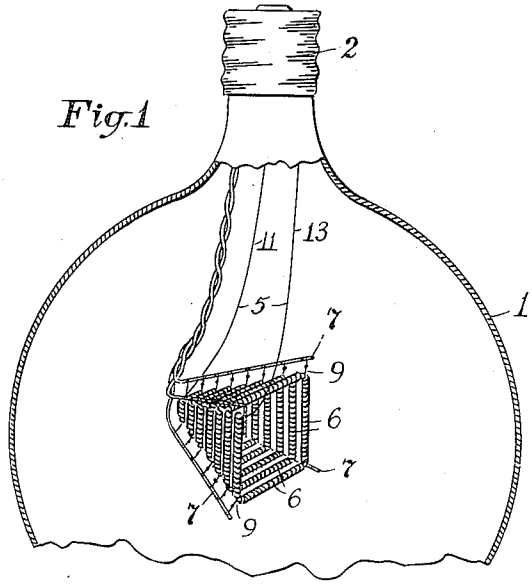


Fig. 1

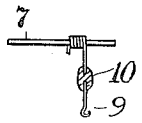


Fig. 4

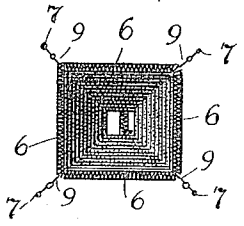


Fig. 2

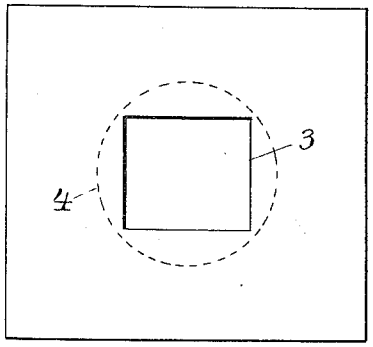


Fig. 3

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FILAMENT FOR INCANDESCENT BULBS.

1,222,119. Specification of Letters Patent. Patented Apr. 10, 1917.

Application filed December 23, 1915. Serial No. 68,303.

To all whom it may concern:

Be it known that I, ALBERT S. MOFFAT, a citizen of the United States, and a resident of Belmont, in the county of Essex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Filaments for Incandescent Bulbs, of which the following is a full, clear, and exact specification.

This invention has for its object the construction of means for providing a more intense light at a moderate cost for stereopticons and moving picture machines, and especially for the latter.

To this end, I have formed a filament for incandescent bulbs which will not only intensify the light emitted therefrom, but will concentrate it upon the rectangular space occupied by a motion picture section. In the usual form of light, the rays issue in a cone whose base is circular and hence must lap over the rectangular picture-space to an extent fully equal in area to that of the space utilized.

To this end, I dispose the filament in a hollow pyramidal form the base of which is the same in contour as the picture-space to be illuminated, and have the filament composed of a long helix wound in a spiral about such a pyramid.

In the drawings forming part of this specification, Figure 1 is a sectional perspective view of an incandescent bulb embodying my improvements. Fig. 2 is an elevation of the filament alone. Fig. 3 is a view of the space upon which the light is to be directed, the dotted circle illustrating the base of the cone of light as usually cast thereon. Fig. 4 is a detail view of one of the suspension devices. Fig. 5 is a sectional diagram of the filament and condenser lenses.

Referring to Fig. 1, the reference numeral 1 designates the glass bulb having the customary threaded portion 2 designed to be screwed into the socket in common use. In Fig. 3, the rectangle 3 represents approximately the size and shape of the aperture framing each picture of a motion-picture film; and the dotted circle 4 represents the size of a cone of light large enough in diameter to cover all the space within the rectangle 3. Upon inspection, it is clear that the space within the circle and exterior to the rectangle is nearly equal to the area of the rectangle itself. This shows that approximately half of the light thus cast is worse than thrown away, not alone because of the waste but because the excessive heat thus generated greatly increases the danger of combustion to which the films are at their best always subjected.

Fig. 2 shows the rectangular shape of the filament body, and Fig. 1 shows its manner of formation. In making it, a long filamentous body, as a tungsten wire 5, is wound into a comparatively long helix. This helix 6 is then wound spirally upon a pyramid of the proper shape and size, beginning at the base and terminating near the apex.

For supporting the coils of this helix, four wires 7 are provided, which are twisted together at their intersection and project not far from and parallel respectively with the corners of the pyramid. From these wire arms 7 several hooks 9 connect the same with the said corners, each hook being in two sections mechanically united but electrically insulated by a small bead of glass 10, as shown in Fig. 4.

Current is transmitted to the filament by a lead 11 connected with one extremity of the helix, and a lead 13 connected with the other end of the helix.

By having the filament in a helix, a maximum of light rays is obtained in the minimum of space. By having the helix wound as a hollow pyramid, the emitted rays are concentrated upon a smaller space than would be the case were the helix coiled in a single plane parallel with the plane of the picture, since the rays from the inner winds can only pass the outer winds by issuing in a straight line within the outer winds, and so on to the film, conforming in contour to the rectangular shape of the picture.

As shown in Fig. 5, the cone or pyramid formed by the wound filament has its sides in line with the light rays to the outermost portion of the condenser lenses 12, so that the rays from all the inner winds can strike only the space on the nearer lens within its margin.

By thus having the base of the pyramid facing the condensers, the winds within it are each substantially in focus with the con-

denser, and hence give a sharper illumination to the picture being thrown upon the screen.

What I claim is:

1. An electric bulb having a filament composed of sets of helices, each set comprising several closely disposed parallel helices in a single plane, the plane of each set being oblique to the line from the center of the filament to the point being illuminated, and the helices nearest said point being the farthest from said line.

2. An electric bulb having a filament composed of a plurality of straight helices in parallel planes disposed to approximate a hollow pyramid.

3. An electric bulb having a filament disposed to form in contour a hollow pyramid having its base rectangular and open toward a rectangular object to be illuminated.

4. An electric bulb having a filament wound in a long helix, and the helix disposed to form a hollow pyramid, the base of the pyramid being rectangular and open.

5. An electric bulb having a filament wound in a long helix, the helix being disposed to form a hollow pyramid, and supporting means for the filament, the supporting means comprising four wire arms supported parallel with and spaced from the corners of the pyramid, and insulated hooks joining the corners of the pyramid to said arms.

In testimony that I claim the foregoing invention, I have hereunto set my hand this 21st day of December, 1915.

ALBERT S. MOFFAT.

Witness:
A. B. UPHAM.